

**NAPEMYIA WEBB, A NEW SYNONYM OF *DIALYSIS* WALKER
(DIPTERA: XYLOPHAGIDAE)**

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Abstract.—*Napemyia* Webb is synonymized with *Dialysis* Walker based on reexamination of the unique holotype of the type species, *N. illinoensis*, and the characters Webb used to define the genus. The phylogenetics of *Dialysis* is briefly discussed. *Dialysis illinoensis* (Webb), n. comb., is regarded as a valid species.

Key Words: Diptera, Xylophagidae, new synonymy, new combination

Webb (1983) described the genus *Napemyia* from a single specimen of a new species, *N. illinoensis*, collected in Vermilion County, Illinois. No additional material has been collected. The obvious close resemblance of the figures in the original description and the description itself to known species of *Dialysis* Walker led Nagatomi (1987: 719) to state: "the genus *Napemyia* may be a synonym of *Dialysis*, because the distinguishing characters are slight."

I recently examined the unique holotype male of *Napemyia illinoensis*, and concluded that *Napemyia* is a synonym of *Dialysis*. The holotype is preserved in alcohol in several pieces. The main parts are in a small vial within the storage vial, and the genitalia in a small microvial. During this study I also examined all Nearctic species of *Dialysis*, and *D. iwatai* Nagatomi from Japan. The rest of this paper presents the argumentation for this synonymy.

REEXAMINATION OF DIAGNOSTIC
CHARACTERS

In the diagnostic paragraph above the formal original generic description, Webb (1983: 822) listed 5 characters as differing from *Dialysis*, implying that the opposite

character state occurs in *Dialysis*. These follow here with a critique of their validity:

1) Elongate parafacial setae.—The facial region of *Dialysis* is deeply concave, such that the parafacials recede into the facial cavity. In all species the upper parafacials are pilose, especially noticeable just below the antennae. Some species, such as *D. dispar* Bigot, have pilosity in this region as long and dense as that found in *N. illinoensis*. In most species of *Dialysis*, the lower parafacial areas near the mouthparts are bare, while they are sparsely haired in *N. illinoensis*. However, I have seen some specimens of *D. dispar* that have this area haired virtually identical to the condition found in *N. illinoensis*. This character is without value in defining *Napemyia*.

2) Ventral plate of male proctiger narrowly emarginate posteriorly.—The ventral plate of the proctiger, the 11th abdominal sternite, is quite small in *Dialysis*, ventral to the cerci, and weakly sclerotized. In nearly all species of *Dialysis* I have examined there is some indication of a posteromedial emargination on this sclerite. In some species it is small and indistinct (e.g. *D. iwatai*), in others the entire median line is weakly sclerotized and the sternite appears almost

divided (e.g. *D. lauta* (Loew)). Only in *D. aldrichi* Williston is the posterior margin virtually entire. In a specimen of *D. rufithorax* (Say) that I examined, the 11th sternite is virtually as illustrated by Webb for *N. illinoensis* (Webb 1983: fig. 4). Unfortunately I could not reevaluate the character state in *Napemyia*, as I could not find this structure among the parts of the holotype.

3) Gonocoxites in ventral view with no open areas.—Most species of *Dialysis* as well as some other xylophagid genera (*Coenomyia* Latreille, *Odontosabula* Matsumura, *Arthropeas* Loew, and *Anacanthaspis* Röder; see figures in Nagatomi and Saigusa 1970) have vaguely defined unsclerotized areas medially on the ventral surface of the gonocoxites (referred to as “basistyles” by Webb). However, Webb himself states that *D. kesseli* Hardy has no such “open areas,” and figures the species thusly (Webb 1978: fig. 4). Nagatomi (1992) noted this statement, and regarded the loss of this membranous area in *D. kesseli* and *N. illinoensis* as a secondary reduction, since he considered the membranous patch to be a synapomorphy of the genera listed above. A paratype male of *D. kesseli* (USNM) shows the presence of a more poorly sclerotized medial area as in other species of *Dialysis*. After light staining of the genitalia of the holotype of *N. illinoensis* with chlorazol black, a small medial “open area” is evident. In excessively cleared specimens the contrast between the median open area and surrounding sclerotization becomes increasingly difficult to detect, apparently the reason why it was sometimes overlooked by Webb. It is clear that this character cannot be considered definitive of *Napemyia*.

4) Penis valves present.—Webb implies that *Dialysis* does not have structures he calls penis valves. These structures are actually aedeagal in origin, being part of the apical portion of the aedeagus (B. J. Sinclair, pers. comm.). However, Webb (1978: 409), in his generic description of *Dialysis*, states “aedeagus terminates posteriorly in two

narrow, reduced penis valves.” In all species that I have examined these structures are present, some being virtually identical to those found in the genitalia of the holotype of *N. illinoensis*.

5) Thyridium lacking.—The “thyridium” found in *Dialysis* is a small, diffuse area around the first branch of the medial vein, which constitutes the most proximal angle of the discal cell. It appears whitish in color due to less pigmentation than the surrounding wing membrane, and sometimes extends proximally along vein M towards the base of the wing. It is variable in extent at the individual level, sometimes being absent in some specimens of a given species. I have noted its absence in individuals of *D. aldrichi*, *D. elongata* (Say), and *D. rufithorax*. This feature is especially less evident to absent in teneral specimens of *Dialysis*. The holotype of *N. illinoensis* seems to be at least slightly teneral, since the wing veins are lightly colored and the wings have an overall light, milky appearance. It is therefore conceivable that additional specimens may reveal the presence of a “thyridium” in some individuals of *N. illinoensis*. Given the individual variation to which this feature is subject, its value as generically definitive of *Napemyia* is dubious.

PHYLOGENETIC CONSIDERATIONS

Webb (1978: fig. 1) presented a “phylogenetic diagram” for the Nearctic species of *Dialysis*, for which in the text (page 405) he stated: “This cladistic diagram contains the least number of convergent origins of the apomorphic alternatives.” The apomorphic character states were displayed on the figured tree. I put these into character matrix form (9 taxa, 13 characters). I did not reevaluate any of the characters or the polarities determined by Webb, but added a hypothetical taxon with all character states coded as plesiomorphic to root the trees to be generated. The character state matrix is presented in Fig. 1 (character states for *Napemyia* are included in the figure but were not

included in this analysis). The matrix was analyzed using Hennig86 (Farris 1988), which produced 18 equally parsimonious trees (length = 25, ci = 52, ri = 61) by the implicit enumeration algorithm. Webb's figured tree was then derived utilizing the "Dos Equis" feature of Hennig86 by moving branches until the topology was obtained. This tree was diagnosed and found to have a length of 27 steps (ci = 48, ri = 54). Thus, the tree published by Webb was 2 steps longer than the actual shortest trees based on his data.

I hoped that the characters used by Webb in analyzing *Dialysis* could be scored for *Napemyia*. However, I found it difficult to differentiate between the alternatives for some of Webb's characters (numbers 4, 6, 7, 10; see list in 1978: 405-406) when viewing actual specimens. Furthermore, some of the character states do not appear to be discrete, such as "hind coxa stramineous to testaceous." Two preliminary analyses in which an attempt was made to score *Napemyia* (character states are shown in the bottom line of the character matrix in Fig. 1; character 10 was coded two different ways) from the original description yielded 20 and 21 equally parsimonious trees. In both analyses *Napemyia* was nested well within *Dialysis* in all trees, and in each analysis was the sister group to *D. fasciventris* (Loew) in 18 trees. While I put little value on these phylogenetic results, they do indicate the close similarity of *Napemyia* to some species of *Dialysis*.

DEFINITION OF *DIALYSIS*

Within the family Xylophagidae (genera listed in Woodley 1989) *Dialysis* is easily characterized by the autapomorphic form of the antennal flagellum. The flagellomeres are largely fused and compressed basally to form a very short, compact base of one flagellomere, smaller in diameter than the pedicel, slightly conical in shape. This is occasionally followed by evidence of a very short second flagellomere that is not com-

	Character number												
	1	2	3	4	5	6	7	8	9	10	11	12	13
outgroup	0	0	0	0	0	0	0	0	0	0	0	0	0
aldrichi	0	1	1	1	0	0	0	0	0	0	0	0	0
dispar	0	0	1	1	0	1	0	0	1	0	0	0	0
elongata	1	1	1	0	0	0	0	0	0	0	0	1	0
fasciventris	0	1	1	0	0	0	0	0	1	1	1	1	0
lauta	0	1	1	1	0	0	0	1	1	1	0	0	0
kesseli	0	0	0	1	1	1	1	1	1	0	0	1	0
mentata	0	1	1	0	0	1	1	1	0	1	0	1	0
rufithorax	0	1	1	1	0	1	1	1	0	1	1	1	1
reparta	0	1	1	1	0	1	1	1	1	1	1	1	0
<i>Napemyia</i>	0	1	0	0	0	0	0	0	1	2	1	1	1
										(?)			

Fig. 1. Character state matrix for *Dialysis*, derived from phylogenetic tree presented by Webb (1978: fig. 1). Bottom line is character state information from original description of *Napemyia* (Webb 1983). Character 10 was coded as state "2" and "?" (unknown) in two different analyses.

pletely fused with the first; this is the case on the right antenna of the holotype of *N. illinoensis*, less apparent on the left. This basal complex is followed by the apical flagellomere which is in the form of a very slender, elongate style, very slightly expanded just before the apex, then tapered to a fine, sharp apex. This apical flagellomere is more than twice as long as the rest of the antenna. Most other xylophagids have a simple flagellum composed of 8 flagellomeres, sometimes tapered apically but not fused. This is the plesiomorphic state for the Brachycera (Woodley 1989). The only exception to this in the family is *Rachicerus* Walker and two closely related genera (*Gymnorhachicerus* Frey and *Paleorachicerus* Nagatomi) that have an apomorphic condition with supernumerary flagellomeres, often pectinate. As *Napemyia* has antennal morphology identical to that of *Dialysis*, this synapomorphy is additional evidence for the synonymy of the two names.

CONCLUSIONS

It is abundantly clear, especially from re-examination of the purportedly diagnostic characters, that *Napemyia* Webb is a synonym of *Dialysis* Walker (NEW SYNONYMY). *Dialysis illinoensis* (Webb) (NEW

COMBINATION) can at present be considered a distinct species. It is possible that the holotype is an aberrant specimen of a previously described species of *Dialysis*, but final disposition requires additional material.

ACKNOWLEDGMENTS

I thank Donald W. Webb and Kathleen R. Methven of the Illinois Natural History Survey for arranging the loan of the holotype of *Napemyia illinoensis*. I also thank Brian Brown of the Natural History Museum of Los Angeles County, Wayne Mathis of the Smithsonian Institution, and A. L. Norrbom and R. W. Poole of the Systematic Entomology Laboratory for reviewing the manuscript.

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